

Asbestos Standard for the Construction Industry



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Occupational Safety and Health Administration**

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Abstract Asbestos is the generic term for a group of naturally occurring, fibrous minerals with high tensile strength, flexibility, and resistance to thermal, chemical, and electrical conditions. In the construction industry, asbestos is found in installed products such as shingles, floor tiles, cement pipe and sheet, roofing felts, insulation, ceiling tiles, fire-resistant drywall, and acoustical products. Very few asbestos-containing products are currently being installed. Consequently, most worker exposures occur during the removal of asbestos and the renovation and maintenance of buildings and structures containing asbestos. Asbestos fibers enter the body by the inhalation or ingestion of airborne particles that become embedded in the tissues of the respiratory or digestive systems. Exposure to asbestos can cause disabling or fatal diseases, such as asbestosis, an emphysemalike condition; lung cancer; mesothelioma, a cancerous tumor that spreads rapidly in the cells of membranes covering the lungs and body organs; and gastrointestinal cancer. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.		
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This informational booklet is intended to provide a generic, non-exhaustive overview of a particular standards-related topic. This publication does not itself alter or determine compliance responsibilities, which are set forth in OSHA standards themselves and the *Occupations Safety and Health Act*. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts.

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Robert B. Reich, Secretary**

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Background

Asbestos is the generic term for a group of naturally occurring, fibrous minerals with high tensile strength, flexibility, and resistance to thermal, chemical, and electrical conditions.

In the construction industry, asbestos is found in installed products such as shingles, floor tiles, cement pipe and sheet, roofing felts, insulation, ceiling tiles, fire-resistant drywall, and acoustical products. Very few asbestos-containing products are currently being installed. Consequently, most worker exposures occur during the removal of asbestos and the renovation and maintenance of buildings and structures containing asbestos.

Asbestos fibers enter the body by the inhalation or ingestion of airborne particles that become embedded in the tissues of the respiratory or digestive systems. Exposure to asbestos can cause disabling or fatal diseases, such as asbestosis, an emphysemalike condition; lung cancer; mesothelioma, a cancerous tumor that spreads rapidly in the cells of membranes covering the lungs and body organs; and gastrointestinal cancer. The symptoms of these diseases generally do not appear for 20 or more years after initial exposure.

OSHA began regulating workplace asbestos exposure in 1970, adopting a permissible exposure limit (PEL) to regulate worker exposures. Over the years, more information on the adverse health effects of asbestos exposure has become available, prompting the agency to revise the asbestos standard several times to better *protect workers*. On August 10, 1994, OSHA issued a revised final standard regulating asbestos exposure in all industries. The newly revised standard for the construction industry lowers the PEL, cutting it in half from 0.2 fibers per cubic centimeter of air (f/cc) to 0.1 f/cc. The standard became effective October 11, 1994; however, various provisions have later startup dates for compliance. (See "Occupational Exposure to Asbestos," *Title 29 Code of Federal Regulations* (CFR) 1926.1101 for specific dates.)

Approximately 3.2 million workers in new construction, building renovation, and maintenance and custodial work in buildings and industrial facilities are affected by the new standard. OSHA estimates, conservatively, that about 42 additional cancer deaths

¹ Pure custodial work in manufacturing facilities is covered by the general industry asbestos standard.

per year will be avoided in all industries, in addition to the lives saved of those peripherally exposed to asbestos and the lives saved by earlier OSHA standards.

Work Classification

OSHA 's revised standard establishes a new classification system for asbestos construction work, which clearly spells out mandatory, simple, technological work practices to follow to reduce worker exposures. Four classes of construction activity are matched with increasingly stringent control requirements.²

Class I asbestos work-the most potentially hazardous class of asbestos jobs-involves the removal of thermal system insulation and sprayed-on or troweled-on surfacing asbestos-containing materials or presumed asbestos-containing materials.³ Thermal system insulation includes asbestos-containing materials applied to pipes, boilers, tanks, ducts, or other structural components to prevent heat loss or gain. Surfacing materials include decorative plaster on ceilings, acoustical asbestos-containing materials on decking, or fireproofing on structural members.

Class II work includes the removal of other types of asbestos-containing materials that are not thermal system insulation-such as resilient flooring and roofing materials containing asbestos. Examples of *Class II* work include removal of floor or ceiling tiles, siding, roofing, or transite panels.

Class III asbestos work includes repair and maintenance operations where asbestos-containing or presumed asbestos-containing materials are disturbed.

Class IV operations include custodial activities, where employees clean up asbestos-containing waste and debris. This includes dusting contaminated surfaces, vacuuming contaminated carpets, mopping floors, and cleaning up asbestos-containing or presumed asbestos-containing materials from thermal system insulation.

² See Appendix elsewhere in this publication for a list of provisions broken down by work classification.

³ This includes thermal system insulation and surfacing material found in buildings constructed before 1981.

Scope and Application

The asbestos standard for the construction industry (29 CFR 1926.1101) regulates asbestos exposure for the following activities:

- demolishing or salvaging structures where asbestos is present;
- removing or encapsulating asbestos-containing materials;
- constructing, altering, repairing, maintaining, or renovating asbestos-containing structures or substrates;
- installing asbestos-containing products;
- cleaning up asbestos spills/emergencies; and
- transporting, disposing, storing, containing, and housekeeping involving asbestos-containing products on a construction site.

Provisions of the Standard

OSHA sets out several provisions employers must follow to comply with the asbestos standard. The agency has established strict exposure limits and requirements for exposure assessment, medical surveillance, recordkeeping, "competent persons," regulated areas, and hazard communication.

Permissible Exposure Limit (PEL)

Employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 f/cc as an 8-hour time-weighted average (TWA).

OSHA also established a short-term, exposure limit (STEL) for asbestos. Employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1 f/cc as averaged over a sampling period of 30 minutes.

Exposure Assessments and Monitoring

Employers must assess all asbestos operations for their potential to generate airborne fibers. Employers must use exposure monitoring data to assess employee exposures.

Initial Exposure Assessments

The designated "competent person"⁴ must assess exposures immediately before or as the operation begins to determine expected exposures. The assessment must be done in time to comply with all standard requirements triggered by exposure data or the lack of a negative exposure assessment⁵ and to provide the necessary information to ensure all control systems are appropriate and work properly.

The initial, exposure assessment must be based on the following:

- the results of employee exposure monitoring,⁶
- all observations, information, or calculations indicating employee exposure to asbestos, including, any, previous monitoring and
- the presumption that employees performing *Class I* asbestos work are exposed in excess of the PEL and STEL until exposure monitoring proves they are not.

Negative Exposure Assessments

For any specific asbestos job that trained employees perform, employers may show that exposure will be below the PEL by performing an assessment and confirming it by the following:

- "objective data" demonstrating an asbestos-containing material or activities involving it cannot release airborne fibers in excess of the PEL and STEL,
- "historical data" from prior monitoring for similar asbestos jobs performed within 12 months of the current job and obtained during work operations conducted under similar conditions,
- employees training and experience were no more extensive for previous jobs than training for current employees,
- data show a high degree of certainty that employee exposures will not exceed the PEL and STEL under current conditions, and

⁴The standard defines as one who can identify existing asbestos hazards in the workplace and who has the authority to correct these hazards.

⁵A negative exposure assessment demonstrates that employee exposure during an operation is consistently below the PEL.

⁶Unless there has been a negative pressure exposure assessment. In certain less hazardous operations, the employer may be exempt from monitoring. See 29 CFR 1926.1101 for specific requirements.

- current initial exposure monitoring used breathing zone air samples representing the 8-hour TWA and 30-minute short term exposures for each employee in those operations most likely to result in exposures over the PEL for the entire asbestos job.

Exposure Monitoring

Employee exposure measurements must be made from breathing zone air samples representing the 8-hour TWA and 30-minute short-term exposures for each employee.

Employers must take one or more samples representing full-shift exposure to determine the 8-hour TWA exposure in each work area. To determine short-term employee exposures, employers must take one or more samples representing 30-minute exposures for the operations most likely to expose employees above the STEL in each work area.

Employers must allow affected employees and their designated representatives to observe any employee exposure monitoring. When observation requires entry into a regulated area, the employer must provide and require the use of protective clothing and equipment.

Periodic Monitoring

For *Class I and II* jobs, employers must monitor daily each employee working in a regulated area, unless a negative exposure assessment for the entire operation already exists and nothing has changed. When all employees use supplied-air respirators operated in positive-pressure mode, however, employers may discontinue daily monitoring. Note that for employees performing Class I work using control methods not recommended in the standard, employers must continue daily monitoring, even when employees use supplied-air respirators.

For operations other than *Class I and II*, employers must monitor all work where exposures can possibly exceed the PEL often enough to validate the exposure prediction.

If periodic monitoring shows employee exposures below the PEL and STEL, the employer may discontinue monitoring for the represented employees.

Additional Monitoring

Changes in processes, control equipment, level of personnel experience, or work practices that could result in exposures above the PEL or STEL-regardless of a previous negative exposure assessment for a specific job-require additional monitoring.

Medical Surveillance

Employers must provide a medical surveillance program for all employees

- who for a combined total of 30 or more days per year-engage in *Class I, II, or III* work or are exposed at or above the PEL or SUM, or
- who wear negative-pressure. respirators.

A licensed physician must perform or supervise a11 medical exams and procedures, provided at no cost to employees and at a reasonable time.

Employers must make medical exams and consultations available to employees

- prior to employee assignment to an area where negative pressure respirators are worn,
- within 10 working days after the 30th day of exposure for employees assigned to an area where exposure is at or above the PEL for 30 or more days per year,
- at least annually thereafter, and
- when tile examining physician suggests them more frequently.

If the employee was examined within the past 12 months and that exam meets the criteria of the standard, however, another medical exam is not required.

Medical exams must include the following:

- a medical and work history,
- completion of a standardized questionnaire with the initial exam (See 29 CFR 1926.1101 Appendix D, Part 1) an abbreviated standardized questionnaire with annual, exams (See 29 CFR 1926.1101, Appendix D, Part 2),

- a physical exam focusing on the pulmonary and gastrointestinal systems, and
- any other exams or tests suggested by the examining physician.

Employers must provide the examining physician

- a copy of OSHA's asbestos standard and its appendices,
- a description of the affected employee's duties relating to exposure,
- the employee's representative exposure level or anticipated exposure level,
- a description of any personal protective equipment and respiratory equipment used, and
- information from previous medical exams not otherwise available.

It is the employer's responsibility to obtain the physician's written opinion, containing results of the medical exam and

- any medical conditions of the employee that increase health risks from asbestos exposure,
- any recommended limitations on the employee or protective equipment used,
- a statement that the employee has been informed of the results of the medical exam and any medical conditions resulting from asbestos exposure, and
- a statement that the employee has been informed of the increased risk of lung cancer from the combined effect of smoking and asbestos exposure.

The physician must not reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure to asbestos. The employer must provide a copy of the physician's written opinion to the affected employee within 30 days after receipt.

Recordkeeping

Objective Data Records

Where employers use objective data to demonstrate that products made from or containing asbestos cannot release fibers in concentrations at or above the PEL or STEL, they must keep an accurate record for as long as it is relied on and include

- the exempt product,
- the source of the objective data,
- the testing protocol, test results, and analysis of the material for release of asbestos,
- a description of the exempt operation and support data, and
- other data relevant to operations, materials, processes, or employee exposures.

Monitoring Records

Employers must keep records of all employee exposure monitoring for at least 30 years, including

- the date of measurement,
- the operation involving asbestos exposure that was monitored,
- sampling and analytical methods used and evidence of their accuracy,
- the number, duration, and results of samples taken,
- the type of protective devices worn, and
- the name, social security number, and exposures of the represented employees.

Employers must make exposure records available when requested to affected employees, former employees, their designated representatives, and/or OSHA's Assistant Secretary.

Medical Surveillance Records

Employers must keep all medical surveillance records for the duration of the employee's employment plus 30 years, including

- the employee's name and social security number,
- the employee's medical exam results, including the medical history, questionnaires, responses, test results, and physician's recommendations,

- the physician's written opinions,
- any employee medical complaints related to asbestos exposure, and
- a copy of the information provided to the examining physician.

Employee medical surveillance records must be available to the subject employee, anyone having specific written consent of that employee, and/or OSHA's Assistant Secretary.

Other Recordkeeping Requirements

Employers must maintain all employee training records for 1 year beyond the last date of employment for each employee.

Where data demonstrates presumed asbestos-containing materials do not contain asbestos, building owners or employers must keep the records for as long as they rely on them. Building owners must maintain written notifications on the identification, location, and quantity of any asbestos-containing or presumed asbestos containing materials for the duration of ownership and transfer the records to successive owners.

When an employer ceases to do business without a successor to keep the records, the employer must notify the Director of the National Institute for Occupational Safety and Health (NIOSH) at least 90 days prior to their disposal and transmit them as requested.

“Competent Person” Requirements

On all construction sites with asbestos operations, employers must name a “competent person” qualified and authorized to ensure worker safety and health, as required by *Subpart C, General Safety and Health Provisions for Construction* (29 CFT 1926.20). Under these requirements for safety and health prevention programs, the “competent person” must frequently inspect job sites, materials, and equipment.

In addition, for *Class I* jobs the "competent person" must inspect onsite at least once during each work shift and upon employee request. For *Class II and III* jobs, the "competent person" must inspect often enough to assess changing conditions and upon employee request.

At worksites where employees perform *Class I or II* asbestos work, the "competent person" must supervise

- the setup and ensure the integrity of regulated areas, enclosures, or other containments by onsite inspection,
- setup procedures to control entry to and exit from the enclosure or area,
- all employee exposure monitoring, ensuring it is properly conducted,
- use of required protective clothing and equipment by employees working within the enclosure and/or using glove bags,⁷
- proper setup, removal, and performance of engineering controls, work practices, and personal protective equipment through onsite inspections,
- employee use of hygiene facilities and required decontamination procedures, and
- notification requirements.

The "competent person" must attend a comprehensive training course for contractors and supervisors certified by the U.S. Environmental Protection Agency (EPA) or a state-approved training provider or a course that is equivalent in length and content.

For *Class III and IV* asbestos work, training must include a course equivalent in length and content to the 16-hour "Operations and Maintenance" course developed by EPA for maintenance and custodial workers.⁸

Regulated Areas

A regulated area is a marked off site where employees work with asbestos, including any adjoining areas) where debris and waste from asbestos work accumulates or where airborne concentrations of asbestos exceed or can possibly exceed the PEL.

All *Class I, II, and III* asbestos work or any other operations where airborne asbestos exceeds the PEL must be done within regulated areas. Authorized personnel⁹

⁷ A plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

⁸ For more specific information, see 40 CFR 763.92(a)(2).

⁹ Any person permitted by the employer and required by work duties to be present in regulated areas.

only may enter: The designated "competent person" supervises all asbestos work performed in the area. (See the "competent person" requirements elsewhere in this publication.)

Employers must mark off the regulated area in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Critical barriers¹⁰ or negative-pressure enclosures may mark off the regulated area.

Posted warning signs demarcating the area must be easily readable and understandable. The signs must bear the following information:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORY AND PROTECTIVE CLOTHING ARE
REQUIRED IN THIS AREA**

Employers must supply a respirator to all persons entering regulated areas. (See respiratory protection requirements elsewhere in this publication.) Employees must not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

An employer performing work in a regulated area must inform other employers onsite of the

- nature of the work,
- regulated area requirements, and
- measures taken to protect onsite employees.

The contractor creating or controlling the source of asbestos contamination must abate the hazards. All employers with employees working near regulated areas must assess each day the enclosure's integrity or the effectiveness of control methods to prevent airborne asbestos from migrating.

¹⁰ Plastic sheeting placed over all openings to the work area to prevent airborne asbestos from migrating to an adjacent area.

A general contractor on a construction project must oversee all asbestos work, even though he or she may not be the designated "competent person." As supervisor of the entire project, the general contractor determines whether asbestos contractors comply with the standard and ensures correct any problems.

Communication of Hazards

Notification Requirements

The communication of asbestos hazards is vital to prevent further overexposure. Most asbestos-related construction involves previously installed building materials; Building owners often are the only or best source of information concerning them. The owners and employers of potentially exposed employees have specific duties under the standard.

Before beginning work, building owners must identify at the worksite all thermal system insulation, sprayed or troweled-on surfacing materials in buildings, and resilient flooring material installed before 1981. Building owners also must notify, in writing, the following persons of the presence, locations, and quantity of asbestos-containing or presumed asbestos-containing materials:

- prospective employers applying or bidding for work in or adjacent to areas containing asbestos,
- the owner's employees who work in or nearby these areas,
- other employers on multi-employer *worksites* with employees working in or adjacent to the area, and
- tenants who will occupy the areas containing such material.

All employers discovering asbestos-containing materials on a worksite must notify the building owner and other employers onsite within 24 hours of its presence, location, and quantity. Employers also must inform.. building owners and employees working in nearby areas of the precautions taken to confine airborne asbestos. Within 10 days of project completion, employers must inform building owners and other employers onsite of the current locations and quantity of remaining asbestos-containing materials and any final monitoring results.

At any time, employers or building owners may demonstrate that a presumed asbestos-containing material does not contain asbestos by inspecting the material (conducted according to the requirements of the *Asbestos Hazard Response Act* (AHERA)(40 CFR 763, Subpart E)) and by performing tests to prove asbestos is not present.¹¹

Employers do not have to inform employees of asbestos-free building materials present; however, employers must retain the information, data, and analysis supporting the determination. (See recordkeeping requirements elsewhere in this publication for more specific information.)

Signs

At the entrance to mechanical rooms or areas containing thermal system insulation and surfacing asbestos-containing materials, the building owner must post signs identifying the material present, its specific location, and appropriate work practices that ensure it is not disturbed.

Employers must post warning signs in regulated areas to inform employees of the dangers and necessary protective steps to take before entering. (See the regulated area requirements elsewhere in this publication.)

Labels

Employers must attach warning labels to all products and containers of asbestos, including waste containers, and all installed asbestos products, when possible. Labels must be printed in large, bold letters on a contrasting background and used in accordance with OSHA's *Hazard Communication Standard* (29 CFR 1910.1200). All labels must contain a warning statement against breathing asbestos fibers and contain the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

¹¹ See 29 CFR 1926.1101 for specific testing requirements.

Labels are not required where

- asbestos is present in concentrations less than 1 percent by weight or
- a bonding agent, coating, or binder has altered asbestos fibers, prohibiting the release of airborne asbestos over the PEL or STEL during reasonable use, handling, storage, disposal, processing, or transportation.

When building owners or employers identify previously installed asbestos or presumed asbestos-containing materials labels or signs must be attached or posted to inform employees which materials contain asbestos. Attached labels must be clearly noticeable and readable.

Employee Information and Training

General Training Requirements. Employers must, at no cost to employees, provide a training program for all employees installing and handling asbestos-containing products and for employees performing Class I through IV asbestos operations. Employees must receive training prior to or at initial assignment and at least annually thereafter.

Training courses must be easily understandable for employees and must inform them of

- ways to recognize asbestos,
- the adverse health effects of asbestos exposure,
- the relationship between smoking and asbestos in causing lung cancer,
- operations that could result in asbestos exposure and the importance of respirators
- the purpose, proper use, fitting instruction, and limitations of respirators,
- the appropriate work practices for performing asbestos jobs,
- medical surveillance program requirements,
- the contents of the standard,

- the names, addresses, and phone numbers of public health organizations that provide information and materials or conduct smoking cessation programs, and
- sign and label requirements and the meaning of legends on them.

The employer also must provide, at no cost to employees, written materials relating to employee training and self-help smoking cessation programs.

Additional Training Based on Work Class. For *Class I and II* operations, training must be equivalent in curriculum, method, and length to the Model Accreditation Plan (MAP) asbestos abatement worker training (40 CFR 763, Subpart E, Appendix C). For employees performing *Class II* operations involving one generic category of building materials containing asbestos (e.g., roofing, flooring, or siding materials or transite panels), training may be covered in an 8-hour course that includes "hands-on" experience.

For *Class III* operations, training must be equivalent in curriculum and method to the 16-hour "Operations and Maintenance" course developed by EPA for maintenance and custodial workers whose work disturbs asbestos-containing materials (See 40 CFR 763.92). The course must include "hands-on" training on proper respirator use and work practices.

For *Class IV* operations, training must be equivalent in curriculum and method to EPA awareness training.¹² Training must focus on the locations of asbestos-containing or presumed asbestos-containing materials and the ways to recognize damage and deterioration and avoid exposure. The course must be at least 2 hours in length.

Employers must provide OSHA's Assistant Secretary and the Director of NIOSH all information and training materials as requested.

¹² See 29 CFR 1926.1101 for more information.

Methods of Compliance

Control Measures

For all covered work, employers must use the following control methods to comply with the PEL and STEL:

- local exhaust ventilation equipped with HEPA13-filter dust collection systems,
- enclosure or isolation of processes producing asbestos dust,
- ventilation of the regulated area to move contaminated air away from the employees' breathing zone and toward a filtration or collection device equipped with a HEPA filter, and
- feasible engineering and work practice controls to reduce exposure to the lowest possible levels, supplemented by respirators to reach the PEL or STEL or lower.

Employers must use the following engineering controls and work practices for all operations regardless of exposure levels:

- vacuum cleaners equipped with HEPA filters to collect all asbestos-containing or presumed asbestos-containing debris and dust,
- wet methods or wetting agents to control employee exposures-except when infeasible (e.g., due to the creation of electrical hazards, equipment malfunction, and slipping hazards), and
- prompt cleanup and disposal in leak-tight containers of asbestos-contaminated wastes and debris.

The following work practices and engineering controls are **prohibited** for all asbestos-related work or work that disturbs asbestos or presumed asbestos-containing materials, regardless of measured exposure levels or the results of initial exposure assessments:

- high-speed abrasive disc saws not equipped with a point-of-cut ventilator or enclosure with HEPA-filtered exhaust air,

¹³ High-efficiency particulate air (HEPA) filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

- compressed air to remove asbestos or asbestos-containing materials-unless the compressed air is used with an enclosed ventilation system,
- dry sweeping, shoveling, or other dry cleanup of dust and debris, and
- employee rotation to reduce exposure.

In addition, OSHA's asbestos standard established specific requirements for each class of asbestos work in construction.

Class I Work

A designated "competent person" must supervise all *Class I* work, including installing and operating the control system. Employers must place critical barrier over all to regulated areas or use another barrier or isolation method to prevent airborne asbestos from migrating for

- all *Class I* jobs removing more than 25 linear or 10 square feet of thermal system insulation or surfacing material,
- all other *Class I* jobs without a negative exposure assessment, and
- where employees working in areas adjacent to a *Class I* regulated area.

Otherwise, employers must perform perimeter area surveillance during each work shift. No asbestos dust should be visible. Perimeter monitoring must show that clearance levels are met (as contained in 40 CFR 763, Subpart E of the "EPA Asbestos in Schools" rule) or that perimeter area levels are no greater than background levels.

For all *Class I* jobs

- HVAC systems must be isolated in the regulated area by sealing with double layer of 6 mil plastic or the equivalent,
- impermeable dropcloths must be placed on surfaces beneath all removal activity,
- all objects within the regulated area must be covered with secured impermeable dropcloths or plastic sheeting, and

- for jobs without a negative exposure assessment or where exposure monitoring shows the PEL is exceeded, employers must ventilate the regulated area to move the contaminated air away from the employee breathing zone and toward a HEPA filtration or collection device.

In addition, employees performing *Class I* work must use one or more of the following control methods (For the specifications, limitations, and recommended work practices of these required control methods, refer to *Occupational Exposure to Asbestos*, 29 CFR 1926.1101.):

- negative-pressure enclosure systems must be used where the configuration of the work area makes it impossible to erect the enclosure,
- glove bag systems can be used to remove asbestos-containing or presumed asbestos-containing materials from straight runs of piping,
- negative-pressure glove bag systems can be used to remove asbestos or presumed asbestos-containing materials from piping,
- negative-pressure glove box systems can be used to remove asbestos or presumed asbestos-containing materials from pipe runs,
- water spray process systems may be used to remove asbestos or presumed asbestos-containing materials from cold-line piping-if employees carrying out the process have completed a 40-hour training course on its use in addition to training required for all employees performing Class I work, or
- a small walk-in enclosure that accommodates no more than 2 people (mini-enclosure) may be used if the disturbance or removal can be completely contained by the enclosure.

Employers may use different or modified engineering and work practice controls if the following provisions are met:

- the control method encloses, contains, or isolates the process or source of airborne asbestos dust, or captures and redirects the dust before it enters into the employees' breathing zone,

- a certified industrial hygienist or licensed professional engineer qualified as a project designer evaluates the work area, the projected work practices, and the engineering controls and certifies, in writing, that based on evaluations and data the planned control method adequately reduces direct and indirect employee exposure to or below the PEL under worst-case conditions. The planned control method also must prevent asbestos contamination outside the regulated area, as measured by sampling meeting the requirements of EPA's "Asbestos in Schools" rule or perimeter monitoring, and
- before using alternative methods to remove more than 25 linear or 10 square feet of thermal system insulation or surfacing material, employers must send a copy of the evaluation and certification to the OSHA National Office, Office of Technical Support, Room N3653, 200 Constitution Avenue, N.W., Washington, DC 20210.

Class II Work

The "competent person" must supervise all Class II work. Employers must use critical barriers over all openings to the regulated area or another barrier or isolation method to prevent airborne asbestos from migrating for

- all indoor *Class II* jobs without a negative exposure assessment,
- where changing conditions indicate exposure above the PEL, or
- where asbestos-containing materials are not removed Substantially intact.

Otherwise, employers must perform perimeter area monitoring to verify that the barrier works properly. Impermeable dropcloths must be placed on all surfaces beneath removal activities.

All *Class II* asbestos work can use the same work practices and requirements as *Class I* asbestos jobs. Alternatively, *Class II* work can be performed more easily using simple work practices set out in the standard for specific jobs.

For removing vinyl and asphalt flooring materials containing asbestos or installed in buildings constructed before 1981 and not verified as asbestos-free, employers must ensure that employees

- do not sand flooring or its backing,
- do not rip up resilient sheeting,
- do not dry sweep,
- do not use mechanical chipping unless performed in a negative-pressure enclosure,
- use vacuums equipped with HEPA filters to clean floors,
- use wet methods when removing resilient sheeting by cutting,
- use wet methods to scrape residual adhesives and/or backing, remove tiles intact, unless impossible,
- may omit wetting when tiles are heated and removed intact, and
- assume resilient flooring material-including associated mastic and backing-are asbestos-containing, unless an industrial hygienist determines it asbestos-free.

To remove asbestos-containing roofing materials, employers must ensure that employees

- remove them intact,
- use wet methods when possible,
- continuously mist cutting machines during use, unless the "competent person" determines misting to be unsafe,
- immediately HEPA-vacuum all loose dust along the cut,
- lower as soon as possible or by the end of the work shift any unwrapped or unbagged roofing material to the ground via a covered, dust-tight chute, crane, or hoist,
- transfer unwrapped materials to a closed receptacle to prevent dispersing the dust when lowered, and
- isolate roof-level heating and ventilation air intake sources or shut down the ventilation system.

When removing cementitious asbestos-containing siding and shingles or transite panels, employers must ensure that employees

- do not cut, abrade, or break siding, shingles, or transite panels unless methods less likely to result in asbestos fiber release cannot be used,

- spray each panel or shingle with amended water¹⁴ before removing,
- lower to the ground any unwrapped or unbagged panels or shingles via a covered dust-tight chute, crane, or hoist, or place them in an impervious waste bag or wrap them in plastic sheeting, as soon as possible or by the end of the work shift, and
- cut nails with flat, sharp instruments.

When removing asbestos-containing gaskets, employers must ensure that employees

- remove gaskets within glove bags if they are visibly deteriorated and unlikely to be removed intact,
- thoroughly wet the gaskets with amended water prior to removing,
- immediately place the wet gaskets in a disposal container, and
- scrape using wet methods to remove residue.

For removal of any other *Class II* asbestos-containing material, employers must ensure employees

- do not cut, abrade, or break the material unless infeasible,
- thoroughly wet the material with amended water before and during removal,
- remove the material intact, if possible, and
- immediately bag or wrap removed asbestos-containing materials or keep them wet until transferred to a closed receptacle at the end of the work shift.

Employers may use different or modified engineering and work practice controls if

- they can demonstrate by employee exposure data during the use of such methods and under similar conditions that employee exposure will not exceed the PEL under any anticipated circumstances, or

¹⁴ Water to which surfactant (a wetting agent) has been added to increase the ability of the liquid to penetrate an asbestos containing material.

- the "competent person" evaluates the work area, the projected work practices, and the engineering controls and certifies, in writing, that they will reduce all employee exposure to below the PEL under expected conditions. The evaluation must be based on exposure data for conditions closely resembling those of the current job and for employees with equivalent training and experience.

Class III Work

Employers must use wet methods and local exhaust ventilation, when feasible, during Class III work. Where drilling, cutting, abrading, sanding, chipping, breaking, or sawing thermal system insulation or surfacing materials occurs, employers must use impermeable dropcloths as well as mini-enclosures, glove bag systems, or other effective isolation methods. Where no negative exposure assessment exists or monitoring shows the PEL is exceeded, employers must contain the area with impermeable dropcloths and plastic barriers or other isolation methods and ensure that employees wear respirators. (See also respirator requirements elsewhere in this publication.)

Class IV Work

Employees conducting Class N asbestos work must have attended an asbestos awareness training program. Employees must use wet methods and HEPA vacuums to promptly clean asbestos-containing or presumed asbestos-containing debris. When cleaning debris anti waste in regulated areas, employees must wear respirators. In areas where thermal system insulation or surfacing material is present, employees must assume that all waste and debris contain asbestos.

Respiratory Protection

Respirators must be used during

- all *Class I* asbestos jobs,
- all *Class II* work where an asbestos-containing material is not removed substantially intact,
- all *Class II and III* work not using wet methods,

- all *Class II and III* work without a negative exposure assessment
- all *Class III* jobs where thermal system insulation or surfacing asbestos-containing or presumed asbestos-containing material is cut, abraded, or broken,
- all *Class IV* work within a regulated area where respirators are required,
- All work where employees are exposed above the PEL or STEL and
- emergencies.

Employers must provide respirators at no cost to employees, selecting the appropriate type from among those approved by the Mine Safety and Health Administration (MSHA) and NIOSH.

For all employees performing Class I work in regulated areas and for jobs without a negative exposure assessment, employers must provide full-facepiece supplied-air respirators operated in pressure-demand mode and equipped with an auxiliary positive pressure, self-contained breathing apparatus. ¹⁵

Employers must provide half-mask purifying respirators- other than disposable respirators-equipped with high-efficiency filters for *Class II and III* asbestos jobs without a negative exposure assessment and for *Class III* jobs where work disturbs thermal system insulation or surfacing asbestos-containing or presumed asbestos-containing materials.

If a particular job is not covered above and exposures are above the PEL or STEL, the asbestos standard, *Occupational Exposure to Asbestos*, 29 CFR 1926.1101 contains a table specifying types of respirators to use.

Employers must institute a respiratory program in accordance with Respiratory Protection, 29 CFR 1910.134. Employers must permit employees using filter respirators to change the filter elements when breathing resistance increases; employers must maintain an adequate supply of filters for this purpose. Employers must permit employees wearing respirators to leave work areas to wash their faces and respirator facepieces as necessary to prevent skin irritation.

¹⁵ Unless the "competent person" determines wearing such a respirator is not feasible, in which case a tight-fitting powered air-purifying respirator may be worn.

Employers must ensure that tile respirators issued have the least possible facepiece leakage and fit properly. For employees wearing negative-pressure respirators, employers must perform either quantitative or qualitative face fit tests with the initial fitting and at least every 6 months following. The qualitative fit tests can be used only for fit testing of half-mask respirator, where they are permitted or for full-facepiece air-purifying respirators where they are worn at levels where half-facepiece air-purifying respirators are permitted. Employers must conduct qualitative and quantitative fit tests in accordance with *Occupational Exposure to Asbestos* (29 CFR 1926.1001, Appendix C) and use the tests to select facepieces that provide the required protection.

Employers must not assign any employee, who based on the most recent physical exam and the examining physician's recommendations would be unable to function normally, to tasks requiring respirator use. Employers must assign such employees to other jobs or give them the opportunity to transfer different positions in the same geographical area and with the same seniority, status, pay rate, and job benefits as before transferring, if such positions are available.

Protective Clothing

Employers must provide and require the use of protective clothing—such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings—for

- any employee exposed to airborne asbestos exceeding PEL or STEL,
- work without a negative exposure assessment, or
- any employee performing *Class I* work involving the removal of over 25 linear or 10 square feet of thermal system insulation or surfacing asbestos-containing or presumed asbestos-containing materials.

Employers must launder contaminated clothing to prevent the release of airborne asbestos in excess of the PEL or STEL. Any employer who gives contaminated clothing to another person for laundering must inform him or her of the contamination.

Employers must transport contaminated clothing in sealed, impermeable bags or other closed impermeable containers bearing appropriate labels. (See the hazard communication section elsewhere in this publication for label requirements.)

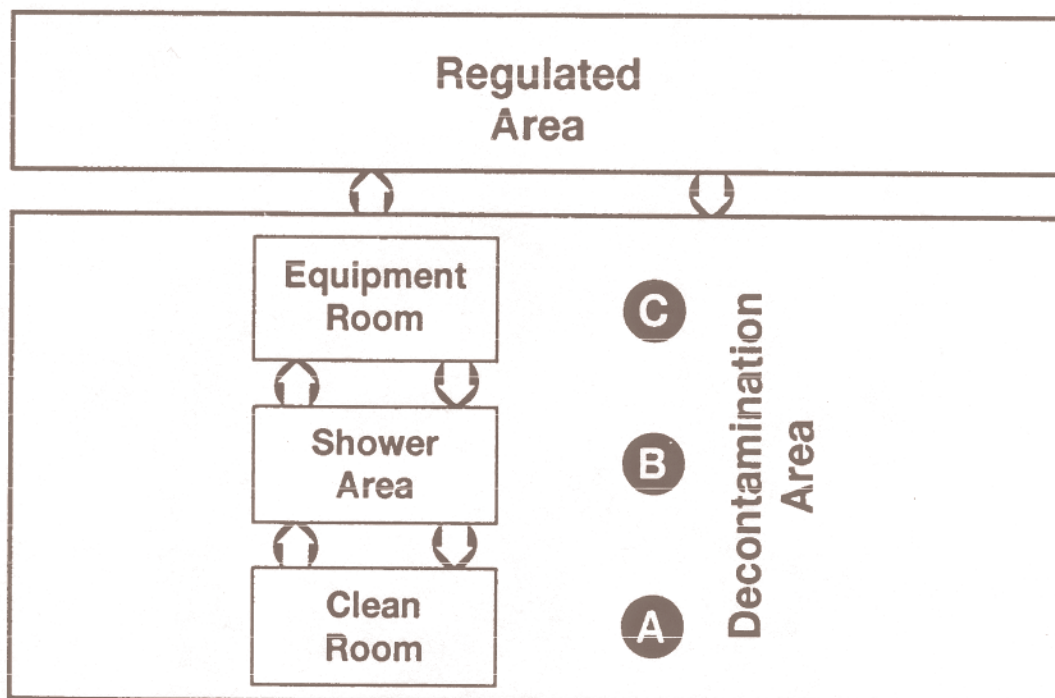
The "competent person" must examine employee works its at least once per work shift for rips or tears. Rips or tears found while the employee is working must be mended or replaced immediately.

Hygiene Facilities

Decontamination Requirements for Class I Asbestos Work

For employees performing *Class I* asbestos jobs involving over 25 linear or 10 square feet of thermal system insulation or surfacing asbestos-containing or presumed asbestos –containing materials, employers must enter and exit the regulated area through the decontamination area.

The decontamination area must be composed of an equipment room, shower area, and clean room in series. The equipment room must be supplied with impermeable, labeled bags and containers to store and dispose of contaminated protective equipment. Shower facilities must be adjacent to both the equipment and clean rooms, unless work is performed outdoors or this arrangement is impractical. If so, employers must ensure that employees remove asbestos contamination from their work suits in the equipment room using a HEPA vacuum before proceeding to a shower non-adjacent to the work area; or remove their contaminated worksuits in the equipment room, and clean worksuits, and proceed to a shower nonadjacent to the work area.



The clean room must have a locker or appropriate storage container for each employee unless work is performed outdoors or this arrangement is not possible. In such a case, employees may clean protective clothing with a portable HEPA vacuum before leaving the regulated area. Employees then must change into "street clothing" in clean change areas.

Before entering the regulated area, employees must enter the decontamination area through the clean room; remove and deposit street clothing within a provided locker; and put on protective clothing and respiratory protection before leaving the clean area. To enter the regulated area, employees must pass through the equipment room.

Before exiting the regulated area, employees must remove all gross contamination and debris and then remove their protective clothing in the equipment room-depositing the clothing in labeled, impermeable bags or containers. Employees must shower before entering the clean room to change into "street clothing."

When employees consume food or beverages at the *Class I* worksite, employers must provide lunch areas with airborne asbestos levels below the PEL and STEL.

Decontamination Requirements for Other Class I and Class II and III Asbestos Work Without Negative Exposure Assessment and Where Exposures Exceed the PEL

Employers must establish an equipment area adjacent to the regulated area for the decontamination of employees and their equipment. The area must be covered by an impermeable dropcloth on the floor or horizontal work surface and must be large enough to accommodate equipment cleaning and personal protective equipment removal without spreading contamination beyond the area. Before removing work clothing, employees must clean it with a HEPA vacuum. All equipment and the surfaces of containers filled with asbestos-containing materials must be cleaned prior to removal. Employers must ensure employees enter and exit the regulated area through the equipment area.

Decontamination Requirements for Class IV Work

Employers must ensure employees performing *Class IV* work within a regulated area comply with the hygiene practices required of employees performing work with higher classifications in that regulated area. Otherwise, employees cleaning up thermal system insulation or asbestos-containing debris must use decontamination

facilities required for *Class II and III* work where exposure exceeds the PEL or no negative exposure assessment exists.

Smoking

Employers must ensure that employees performing any class of asbestos work do not smoke in any work area with asbestos exposure.

Housekeeping

Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal must be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled impermeable containers. Employees must use HEPA-filtered vacuuming equipment and must empty it so as to minimize asbestos reentry into the workplace.

All vinyl and asphalt flooring material must remain intact unless the building owner demonstrates that the flooring does not contain asbestos. Sanding flooring material is prohibited. Employees stripping finishes must use wet methods and low abrasion pads at speeds lower than 300 revolutions per minute. Burnishing or dry buffing may be done only on flooring with enough finish that the pad cannot contact the flooring material. Employees must not dust, sweep, or vacuum without a HEPA filter in an area containing thermal system insulation or surfacing material or visibly deteriorated asbestos-containing materials. Employees must promptly clean and dispose of dust and debris in leak-tight containers.

Other Sources of OSHA Assistance

Safety and Health Management

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their related costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended Safety and *Health Program Management Guidelines* (*Federal Register* 54(18):3908-3916, January 26, 1989). These voluntary guidelines apply to all places of employment covered by OSHA.

The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

- management commitment and employee involvement,
- worksite analysis,
- hazard prevention and control, and
- safety and health training.

The guidelines recommend specific actions under each of these general elements to achieve an effective safety and health program. A single free copy of the guidelines can be obtained from the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., Room N3101, Washington, DC 20210 by sending a self-addressed mailing label with your request.

State Programs

The *Occupational Safety and Health Act of 1970* encourages states to develop and operate their own job safety and health plans. States with plans approved under section 18(b) of the OSH Act must adopt standards and enforce requirements that are at least as effective as federal requirements. There are currently 25 state plan states: 23 of these states administer plans covering both private and public (state and local government) employees; the other 2 states, Connecticut and New York, cover public employees only. Plan states must adopt standards comparable to federal requirements within 6 months of a federal standard's promulgation. Until such time as a state standard is promulgated, federal OSHA provides interim enforcement assistance, as appropriate, in these states. A listing of approved state plans appears at the end of this publication.

Consultation Services

Consultation assistance is available on request to employers who want help in establishing and maintaining a safe and healthful workplace. Largely funded by OSHA, the service is provided at no cost to the employer. Primarily developed for smaller employers with more hazardous operations, the consultation service is delivered by state government agencies or universities employing professional safety consultants and health consultants. Comprehensive assistance includes an

appraisal of all mechanical physical work practices and environmental hazards of the workplace and all aspects of the employer's present job safety and health program.

The program is separate from OSHA's inspection efforts. No penalties are proposed or citations issued for any safety or health problems identified by the consultant. The service is confidential.

For more information concerning consultation assistance, see the list of consultation projects at the end of this publication.

Voluntary Protection Programs

Voluntary Protection Programs (VPPs) and onsite consultation services, when coupled with an effective enforcement program, expand worker protection to help meet the goals of the OSH Act. The three VPPs—Star, Merit, and Demonstration—are designed to recognize outstanding achievement by companies that have successfully incorporated comprehensive safety and health programs into their total management system. They motivate others to achieve excellent safety and health results in the same outstanding way as they establish a cooperative relationship between employers, employees, and OSHA.

For additional information on VPPs and how to apply, contact the OSHA area or regional offices listed at the end of this publication.

Trailing and Education

OSHA's area offices offer a variety of informational services, such as publications, audiovisual aids, technical advice, and such speakers for special engagements. OSHA's Training Institute in Itasca, IL, provides basic and advanced courses in safety and health for federal and state compliance officers, state consultants, federal agency personnel, and private sector employers, employees, and their representatives.

OSHA also provides funds to nonprofit organizations, through grants, to conduct workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually and grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training, and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, (708)297-4810.

For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

OSHA Related Publications

Single free copies of the following materials may be obtained from the OSHA Publications Office, 200 Constitution Avenue, N.W., Room N3101, Washington, DC 20210, Send a self-addressed label with your written request.

All About OSHA - OSHA 2056

Asbestos Standard for Construction Industry - OSHA 3096

Asbestos Standard for Shipyards - OSHA 3145

Chemical Hazard Communication - OSHA 3084

Consultation Services for the Employer - OSHA 3047

How to Prepare for Workplace Emergencies- OSHA 3088

Job Safety and Health Protection (Poster) - OSHA 2203

OSHA: Employee Workplace Rights - OS HA 3021

OSHA Inspections - OSHA 2098

Personal Protective Equipment - OSHA 3077

Respiratory Protection - OSHA 3079

The following publications are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, (202) 512-1800. Include GPO Order No. and make checks payable to n Superintendent of Documents.

Hazard Communication-A Compliance Kit (OSHA 3104)

(A reference guide to step-by-step requirements for compliance with OSHA standard.)
Order No. 029-016-00147-6; cost \$18.00 domestic; \$22.50 foreign.

Hazard Communication Guidelines for Compliance (OSHA 3111)

Order No.029-016-00127-1; cost \$1.00.

Job Hazard Analysis (OSHA 3071)

Order No. 029-016-00142-5; cost \$1.00.

Training Requirements in OSHA Standards and Training Guidelines

(OSHA 2254) Order No. 029-016-00137-9; cost \$4.25.

States with Approved Plans

Commissioner

Alaska Department of Labor
1111 West 8th Street
Room 306
Juneau AK 99801
(907) 465-2700

Director

Industrial Commission of
Arizona
800 W. Washington
Phoenix, AZ 85007
(602) 542-5795

Director

California Department
of Industrial Relations
455 Golden Gate Avenue
4th Floor
S. San Francisco, CA 94102
(415) 703-4590

Commissioner

Connecticut Department
of Labor
200 Folly Brook Boulevard
Wethersfield, CT 06109
(203) 566-5123

Director

Hawaii Department of Labor
and Industrial Relations
830 Punchbowl Street
Honolulu, HI 96813
(808) 586-8844

Commissioner

Indiana Department of Labor
State Office Building
402 West Washington Street
Room W195
Indianapolis, IN 46204
(307) 232-2378

Commissioner

Iowa Division of Labor Services
1000 E. Grand Avenue
Des Moines, IA 50319
(515) 281-3447

Secretary

Kentucky Labor Cabinet
1049 U.S. Highway, 127 South
Frankfort, KY 40601
(502) 564-3070

Commissioner

Maryland Division of Labor
and industry
Department of Licensing
and Regulation
501 St. Paul Place, 2nd Floor
Baltimore, MD 21202-2272
(410) 333-4179

Director

Michigan Department of Labor
Victor Office Center
201 N. Washington Square
P.O. Box 30015
Lansing, MI 48933
(517) 373-9600

Director

Michigan Department of
Public Health
3423 North Logan Street
Box 30195
Lansing, MI 48909
(517) 335-8022

Commissioner

Minnesota Department
of Labor and industry
443 Lafayette Road
St. Paul, MN 55155
(612) 296-2342

Director

Division of industrial
Relations
400 West King Street
Carson City, NV 89710
(702) 687-3032

Secretary

New Mexico Environmental
Department
Occupational Health
and Safety Bureau
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-7850

Commissioner

New York Department
of Labor
State Office Building –
Campus 12
Room 457
Albany, NY 12240
(518) 457-2741

Commissioner

North Carolina Department
of Labor
319 Chapanoke Road
Raleigh, NC 27603
(919) 662-4585

Administrator

Oregon Occupational Safety
and Health Division
Department of Consumer
and Business Services,
Room 430
Labor and Industries Building
350 Winter Street, NE
Salem, OR 97310
(503) 378-272

Secretary

Puerto Rico Department
of Labor and Human Resources
Prudencio Rivera Martinez.
Building
505 Munoz Rivera A-venue
Hato Rey, PR 00918
(809) 754-2119

Commissioner

South Carolina Department
of Labor
3600 Forest Drive
P.O. Box 11329
Columbia, SC 29211-1329
(803) 734-9594

Commissioner

Tennessee Department
of Labor
Attention: Robert Taylor
710 James Robertson Parkway
Gateway Plaza
Suite "A"- 2nd Floor
Nashville, TN 37243-0655
(517) 741-2582

Commissioner

Industrial Commission of Utah
160 East 300 South, 3rd Floor
P.O. Box 146600
Salt Lake City, UT 84114-6600
(801) 530-6880

Commissioner

Vermont Department of Labor
and Industry
120 State Street
Montpelier, VT 05620
(802)828-2788

Commissioner

Virgin Islands Department
of Labor
2131 Hospital Street, Box 890
Christiansted
St. Croix, VI 00840-4666
(809) 773-1994

Commissioner

Virginia Department of Labor
and industry
Powers-Taylor Building
13 South 13th Street
Richmond, VA 23219
(804) 786-9873

Director

Washington Department
of Labor and industries
P.O. Box 44000
Olympia, WA 98504-4000
(206) 956-4200

Administrator

Occupational Safety
and Health Administration
Herschler Building,
2nd Floor East
122 West 25th Street
Cheyenne, WY 82002
(307) 777-7786

OSHA Consultation Project Directory

State	Telephone
Alabama	(205) 348 - 3033
Alaska	(907) 269 - 4939
Arizona	(602) 542 - 5795
Arkansas	(501) 682 - 4522
California	(415) 703 - 4441
Colorado	(303) 491 - 6151
Connecticut	(203) 566 - 4550
Delaware	(302) 577 - 3908
District of Columbia	(202) 576 - 6339
Florida	(904) 488 - 3044
Georgia	(404) 894 - 8274
Guam	(671) 647 - 4202
Hawaii	(808) 586 - 9116
Idaho	(208) 385 - 3283
Illinois	(312) 814 - 2337
Indiana	(317) 232 - 2688
Iowa	(515) 281 - 5352
Kansas	(913) 296 - 4386
Kentucky	(502) 564 - 6895
Louisiana	(504) 342 - 9601
Maine	(207) 624 - 6460
Maryland	(410) 333 - 4218
Massachusetts	(617) 969 - 7177
Michigan	(517) 332 - 8250 (H)
.....	(517) 322 - 1809 (S)
Minnesota	(612) 297 - 2393
Mississippi	(601) 987 - 3981
Missouri	(314) 751 - 3403
Montana	(406) 444 - 6418
Nebraska	(402) 471 - 4717
Nevada	(702) 486 - 5016
New Hampshire	(603) 271 - 2024
New Jersey	(609) 292 - 3923
New Mexico	(505) 827 - 2877
New York	(518) 457- 2481
North Carolina	(919) 733 - 2360
North Dakota	(701) 221 - 5188
(H) - Health	
(S) - Safety	

Ohio.....	(614) 644 - 2631
Oklahoma	(405) 528 - 1500
Oregon	(503) 378 - 3272
Pennsylvania	(412) 357 - 2396
Puerto Rico	(809) 754 - 2171
Rhode Island	(401) 277 - 2438
South Carolina	(803) 734 - 9599
South Dakota	(605) 688 - 4101
Tennessee	(615) 741 - 7036
Texas	(512) 440 - 3834
Utah	(801) 530 - 6868
Vermont	(802) 828 - 2765
Virginia	(804) 786 - 8707
Virgin Islands	(809) 772 - 1315
Washington	(206) 956 - 4249
West Virginia	(304) 558 - 7890
Wisconsin	(608) 266 - 8579(H)
.....	(414) 521 - 5188(S)
Wyoming	(307) 777 - 7786
(H)-Health	
(S)- Safety	

OSHA Area Offices

Area	Telephone
Albany, NY	(518) 464 - 6742
Albuquerque, N M	(505) 766 - 3411
Allentown, PA	(215) 776 - 0592
Anchorage, AK	(907) 271 - 5152
Appleton, WI	(414) 734 - 4521
Augusta, ME	(207) 622 - 8417
Austin, TX	(512) 482 - 5783
Avenel, NJ	(908) 750 - 3270
Baltimore, MD	(410) 962 - 2840
Baton Rouge, LA	(504) 389 - 0474
Bayside, NY	(718) 279 - 9060
Bellevue, WA	(206) 553 - 7520
Billings, MT	(406) 657 - 6649
Birmingham, AL	(205) 731 - 1534
Bismarck, ND	(701) 250 - 4521
Boise, ID	(208) 334 - 1867
Bowmansville, NY	(716) 684 - 3891
Braintree, MA	(617) 565 - 6924
Bridgeport, CT	(203) 579 - 5579
Calumet City, IT	(708) 841 - 3800
Carson City, NV	(702) 885 - 6063
Charleston, WV	(304) 347 - 5937
Cincinnati, OH	(513) 841 - 4132
Cleveland, OH	(216) 522 - 3818
Columbia, SC	(803) 765 - 5904
Columbus, OH	(614) 469 - 5582
Concord, NH	(603) 225 - 1629
Corpus Christi, TX	(512) 884 - 2694
Dallas, TX	(214) 320 - 2 400
Denver, CO	(303) 844 - 5285
Des Plaines IT	(708) 803 - 4800
Des Moines, I A	(515) 284 - 4794
Englewood, CO	(303) 843 - 4500
Erie, PA	(814) 833 - 5758
Fort Lauderdale, FL	(305) 424 - 0242
Fort Worth, TX	(817) 885 - 7025
Frankfort, KY	(502) 227 - 7024
Harrisburg, PA	(717) 782 - 3902
Hartford, CT	(203) 240 - 3152
Hasbrouck Heights, NJ	(201) 288 - 1700
Hato Rey, PR	(809) 766 - 5 457

Honolulu, HI	(808) 541 - 2685
Houston, TX	(713) 286 - 0583
Houston; TX	(713) 591 - 2438
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Jacksonville, FL	(904) 232 - 2895
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Omaha, NE	(402) 221 - 3182
Parsippany, NJ	(201) 263 - 1003
Peoria, IL	(309) 671 - 7033
Philadelphia, PA	(215) 597 - 4955
Phoenix, AZ	(602) 640 - 2007
Pittsburgh, PA	(412) 644 - 2903
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Springfield, MA.....	(413) 785 - 0123
St. Louis, MO	(314) 425 - 4249
Syracuse, NY	(315) 451 - 0808
Tampa, FL	(813) 626 - 1177
Tarrytown, NY	(914) 682 - 6151
Toledo, OH	(419) 259 - 7542
Tucker, GA	(404) 493 - 6644
Westbury, NY	(516) 334 - 3344
Wichita, KS	(316) 269 - 6644
Wilkes-Barre, PA	(717) 826 - 6538

Appendix – Quick Reference of Provisions by Work Class

	Class I	Class 2	Class 3	Class 4
Definition	Removal of thermal system insulation (TSI) and surfacing materials (SM)	Removal of all other asbestos not TSI or SM	Maintenance and repair operations disturbing asbestos-containing materials	Housekeeping and custodial operations (including construction site cleanup)
Regulated Areas	Required (signs required)	Required (signs required)	Required (signs required)	Required (signs required)
“Competent Person”	Required onsite <ul style="list-style-type: none"> • inspect each workshift • contractors and supervisors training required 	Required onsite <ul style="list-style-type: none"> • inspect often • contractors and supervisors training required 	Required onsite <ul style="list-style-type: none"> • inspect often • operations and maintenance training required 	Required onsite <ul style="list-style-type: none"> • inspect often • operations and maintenance training required
Air Monitoring	<ul style="list-style-type: none"> • Initial if no negative exposure assessment (NEA) • Daily if no NEA • Terminate if < permissible exposure limit (PEL) • Additional if conditions change 	<ul style="list-style-type: none"> • Initial if no NEA • Daily if no NEA • Terminate if < PEL • Additional if conditions change 	<ul style="list-style-type: none"> • Initial if no NEA • Periodic to accurately predict if > PEL • Terminate if < PEL • Additional if conditions change 	
Medical Surveillance	Required if <ul style="list-style-type: none"> • wearing negative-pressure respirator • > PEL • > 30 days exposure/year 	Required if <ul style="list-style-type: none"> • wearing negative-pressure respirator • > PEL • > 30 days exposure/year 	Required if <ul style="list-style-type: none"> • wearing negative-pressure respirator • > PEL • > 30 days exposure/year 	Required if <ul style="list-style-type: none"> • wearing negative-pressure respirator • > PEL • > 30 days exposure/year
Respirators	Mandatory for all Class I jobs	Mandatory if <ul style="list-style-type: none"> • non-intact removal • no NEA • > PEL • dry removal (except for roofing) • in emergencies 	Half-mask air-purifying respirator minimum if <ul style="list-style-type: none"> • no NEA • TSI or SM disturbed • > PEL Mandatory if <ul style="list-style-type: none"> • dry removal (except for roofing) • in emergencies 	Mandatory <ul style="list-style-type: none"> • in regulated area where required • if > PEL in emergencies
Protective Clothing and Equipment	Required for all jobs if <ul style="list-style-type: none"> • > 25 linear or 10 square feet of TSI or SM removal • no NEA • > PEL 	Required for all jobs if <ul style="list-style-type: none"> • no NEA • > PEL 	Required for all jobs if <ul style="list-style-type: none"> • no NEA • > PEL 	Required for all jobs if <ul style="list-style-type: none"> • no NEA • > PEL
Training	Equivalent to <i>Asbestos Hazard Response Act</i> (AHERA) worker course	Equivalent to AHERA worker course or specific work practices if removing one ACM only	Equivalent to AHERA operations and maintenance course	Equivalent to AHERA Awareness Training

Decontamination Procedures	<p>Full decon unit required if</p> <ul style="list-style-type: none"> • > 25 linear or 10 square feet TSI or SM removal connected to shower/clean room required • vacuum, change, shower elsewhere • detailed procedures <p>Lunch areas required</p> <ul style="list-style-type: none"> • If < 25 linear or 10 square feet TSI or SM removal or > PEL or no NEA • equipment room/area required • dropcloths required • area must accommodate cleanup • must decontaminate all personal protective equipment • must enter regulated area through equipment room/decon area <p>No smoking in work area</p>	<p>If > PEL or no NEA</p> <ul style="list-style-type: none"> • equipment room/area required • dropcloths required • area must accommodate cleanup • must decontaminate all personal protective equipment • must enter regulated area through equipment room/decon area <p>No Smoking in work area</p>	<p>If > PEL or no NEA</p> <ul style="list-style-type: none"> • equipment room/area required • dropcloths required • area must accommodate cleanup • must decontaminate all personal protective equipment • must enter regulated area through equipment room/decon area <p>If NEA, must vacuum</p> <p>No Smoking in work area</p>	<p>If > PEL or no NEA</p> <ul style="list-style-type: none"> • equipment room/area required • dropcloths required • area must accommodate cleanup • must decontaminate all personal protective equipment • must enter regulated area through equipment room/decon area <p>No Smoking in work area</p>
Required Work Practices and Engineering Controls	<ul style="list-style-type: none"> • wet methods • HEPA vacuum • prompt cleanup/disposal 	<ul style="list-style-type: none"> • wet methods • HEPA vacuum • prompt cleanup/disposal 	<ul style="list-style-type: none"> • wet methods • HEPA vacuum • prompt cleanup/disposal 	<ul style="list-style-type: none"> • wet methods • HEPA vacuum • prompt cleanup/disposal
Required Work Practices and Engineering Controls to comply with Permissible Exposure Limit (PEL)	<ul style="list-style-type: none"> • HEPA local exhaust • enclosure • directed ventilation • other work practices • supplement with respirators 	<ul style="list-style-type: none"> • HEPA local exhaust • enclosure • directed ventilation • other work practices • supplement with respirators 	<ul style="list-style-type: none"> • HEPA local exhaust • enclosure • directed ventilation • other work practices • supplement with respirators 	<ul style="list-style-type: none"> • HEPA local exhaust • enclosure • directed ventilation • other work practices • supplement with respirators
Prohibited Work Practices and Engineering Controls	<ul style="list-style-type: none"> • high speed abrasive disc saws without HEPA • compressed air without capture device • dry sweeping/shoveling • employee rotation 	<ul style="list-style-type: none"> • high speed abrasive disc saws without HEPA • compressed air without capture device • dry sweeping/shoveling • employee rotation 	<ul style="list-style-type: none"> • high speed abrasive disc saws without HEPA • compressed air without capture device • dry sweeping/shoveling • employee rotation 	<ul style="list-style-type: none"> • high speed abrasive disc saws without HEPA • compressed air without capture device • dry sweeping/shoveling • employee rotation

Appendix – Quick Reference of Provisions by Work Class

	Class 1	Class 2	Class 3	Class 4
Controls and Work Practices	<ul style="list-style-type: none"> critical barriers/isolation methods required if <ul style="list-style-type: none"> > 25 linear or 10 square feet of TSI or SM removal < 25 linear or 10 square feet of TSI or SM removal only if no NEA or adjacent workers HVAC isolation required dropcloths required directed ventilation required if no NEA or > PEL <p>Also, one or more of the following controls must be used:</p> <ul style="list-style-type: none"> negative-pressure enclosure glove bag for straight runs of pipe negative-pressure glove box for pipe runs water spray process mini-enclosure 	<p>For indoor work only:</p> <ul style="list-style-type: none"> critical barriers/isolation methods required if <ul style="list-style-type: none"> no NEA likely > PEL non-intact removal dropcloths required <p>If > PEL, must use:</p> <ul style="list-style-type: none"> local HEPA exhaust process isolation directed ventilation additional feasible controls supplemented with respirators <p>For removal of vinyl and asphalt flooring materials:</p> <ul style="list-style-type: none"> no standing HEPA vacuum wet methods no dry sweeping chipping done in negative-pressure enclosure intact removal, if possible dry heat removal allowed assume contains asbestos without an analysis <p>For removal of built-up roofing materials or asbestos-cement shingles:</p> <ul style="list-style-type: none"> intact removal, if possible wet methods, if feasible cutting machine misting HEPA-vacuum debris lower by day's end control dust of unbagged material roof vent system protected <p>For removal of cementitious siding, shingles, or transite panels:</p> <ul style="list-style-type: none"> intact removal, if possible wet methods lower via dust-tight chute by day's end cut nail heads <p>For removal of gaskets:</p> <ul style="list-style-type: none"> use glove bags if not intact wet removal prompt disposal wet scraping <p>Additional requirements:</p> <ul style="list-style-type: none"> wet methods intact removal, if possible cutting, abrading, or breaking prohibited 	<ul style="list-style-type: none"> critical barriers required <ul style="list-style-type: none"> if no NEA PEL via monitoring dropcloths required local HEPA exhaust required <p>Enclosure or isolation of operation required if: TSI or SM is drilled, cut, abraded, sanded, sawed or chipped</p>	<p>* See required Work Practices and Engineering Controls</p>

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* These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective, as the federal standard.